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FIG. 1
Figs. 2, 3, and 4 will be found in the text

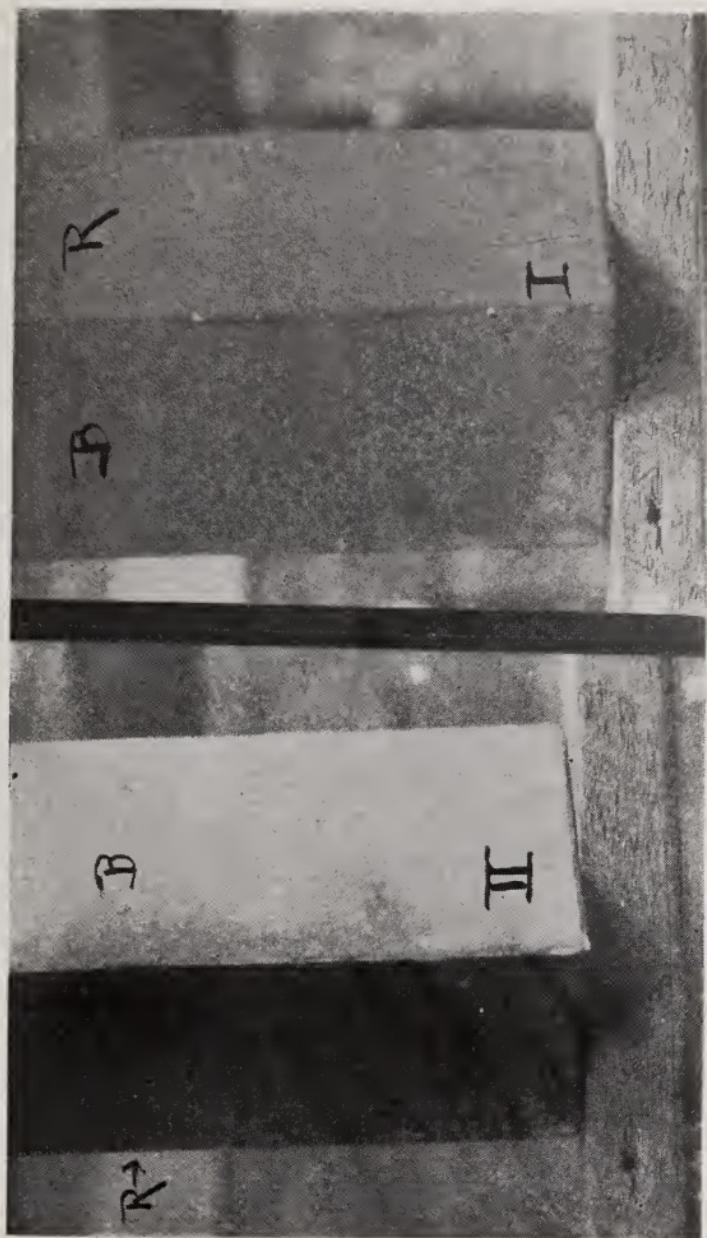




FIG. 5
Reproduced from a Platinum Print
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FIG. 6
Reproduced from a Pigment Print
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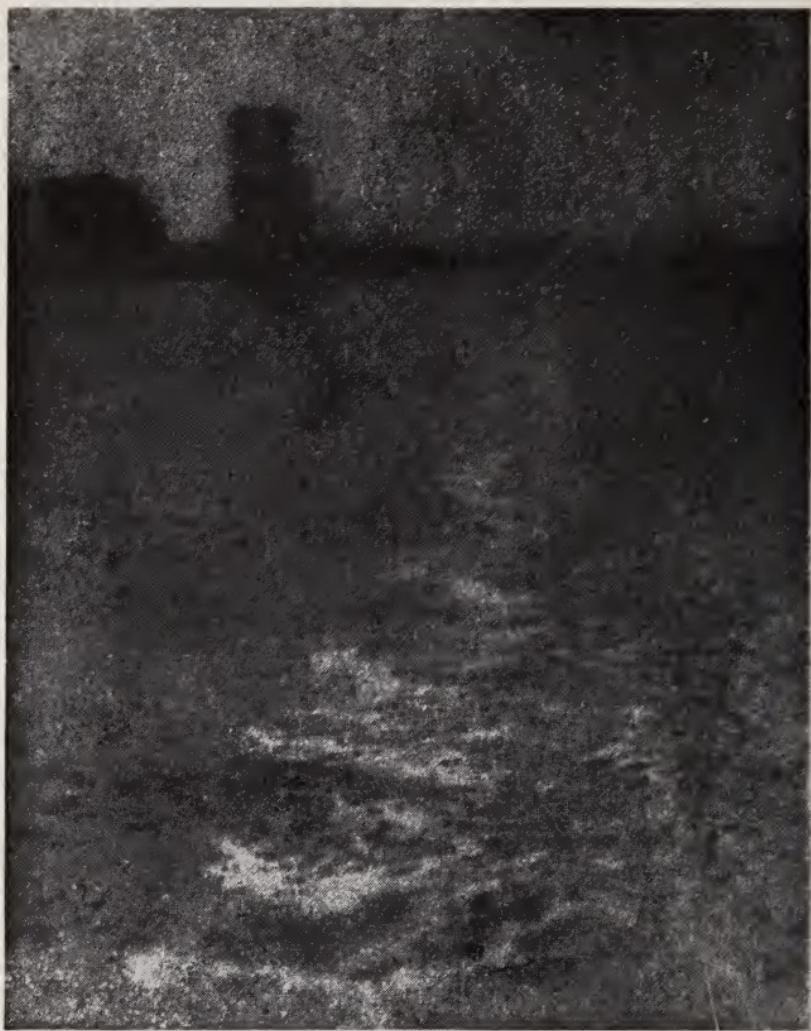


FIG. 7
Reproduced from a Pigment Print
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FIG. 8
Reproduced from a Gaslight Print
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FIG. 8a
Reproduced from a Pigment Print
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FIG. 9

Reproduced from a Pigment Print,
the negative being made with a soft-focus lens
T. O'Conor Sloane, Jr

The Photo-Miniature

A Magazine of Photographic Information

EDITED BY JOHN A. TENNANT

Volume XV

January, 1920

Number 178

Photography as a Craft

In the monograph which follows the reader is offered a lively and pointed consideration of certain principles in negative making and printing which, in practical application, give the photographic worker such complete control of these processes as to ensure his reaching the predetermined or desired end-result in the photograph. Here, obviously, we have something of vital interest to every intelligent photographer, whether he be an amateur, professional worker, or specialist. It is the end-result, the print, which spells success or failure in all our photography, whether we work for pleasure or profit. The ways and means to be employed in the application of the principles herein laid down are clearly set forth and illustrated as they have been demonstrated in the author's practice. There is nothing theoretical or problematical; the discussion is intensely practical, and affords a wealth of workable suggestion which can be turned to profitable use.

This explanation or summary of its practical content is placed here, at the very beginning, because the little book was written, not to display the individual methods of its author, but as a sort of protest against the present-day tendency to over-commercialize photography, and as a plea for its recognition as a craft. There is, of course, no intention to deny the great value of commercialized photography in the industries, or to decry the commercialization of methods and material where uniformity of product and quantity production

offer the best service. But there is an insistence upon the excellence of photography considered and followed as a craft, i. e., an occupation requiring special skill and dexterity or handiwork, wherein the personality and individuality of the worker count for more than mechanical method or efficiency. It is interesting to note in passing that those who follow photography in this way, as a craft wherein individuality and quality of product are opposed to quantity and machine production, grow in number year by year, and are receiving due recognition and reward. Among these craftsmen in photography, Mr. T. O'Conor Sloane, Jr., of New York City, who generously gives us here of his research and experience, has already achieved a notable success.—**EDITOR.**

Happy is the man who can make his living by a craft; he is not manufacturing in the modern sense, but is making something the excellence and value of which depends, to a very great extent, on his own personality and viewpoint.

The End-Result. Photography, as practised by the great majority of amateurs and professionals, is a mechanical process of near reproduction, and with this phase of the subject we are not now concerned. This monograph is based on the assumption that the camera can be used as a tool and not as a machine, and that the whole effort of the photographer is to attain a certain definite and foreseen end-result. In most cases this end-result will be very far from even an approximate rendition of the light intensities reflected from the object photographed. Such a true mechanical rendition of the light intensities of a colored object or set of objects will often give a completely inaccurate impression to the observer. Without at the moment going into orthochromatics, it is perfectly possible to place a green spot on a red background, the luminosity of each color being the same—a correct rendition in monochrome would be a grey spot on an identical background, whereas, physiologically, red is a brighter color than green. So let it be understood now and for all time that

what is wanted is not correct rendition of light values, but an end-result, a print reproducing what the photographer *sees* in the object photographed, altered in tone relation as he sees fit.

Know What You Want. Full directions for painting a picture can be given in a paragraph. Take a box of paints, some brushes, and, *knowing what you want*, apply the colors to canvas. The rest is practice.

The same holds true for photography. *Know what you want.* As in any art or craft, you must have a decorative sense, a feeling for form and spacing: more than in any other a grasp of tone relations and values. Without these it is no more easy to make a *picture* by photography than by any other method.

The Field of Discussion. Here we are going to keep within narrow limits and consider only the making of the negative and print at length, with a few words about the less important phases. The basis of everything is the negative; but it is only a basis. There is no such thing as a "good technical negative" *per se*. From our standpoint a negative is good only if it suits and aids in arriving at the final result desired, so that the making of the negative must first be taken up in perhaps somewhat tiring detail, and then most of the complexities eliminated for practical operation.

Equipment. Before this, however, mind one thing—simplicity—the fewest lenses, the fewest kinds of plates, the fewest chemicals; but plenty of trays and clean water. Photography is today to a great extent run by the man who has something to sell—so beware the advertisement. Any standard anastigmat will do, a *good* soft-focus lens; of which more hereafter, and, for some work, a Petzval portrait lens, will cover all requirements. Pick out your brand of plate by choosing the box you think will look best on your shelf; you will need a fast plate and a double-coated orthochromatic; these two will fill most needs. But, having picked your plate, stick to it.

Two developers are all that are needed: one of the soft or metol type, another of the ortol or even the hydroquinone type, working hard.

With this introduction, and assuming a knowledge on

the part of the reader of at least the simplest form of mechanical photography, namely push the button and use the tank, we will proceed.

Negative-Making. The negative image is composed of metallic silver reduced from the silver haloid in the emulsion by the developer; the more opaque the image the more silver has been reduced.

Some years ago Hurter and Driffield conducted a series of experiments on the scientific basis of negative-making, and certain of the results attained are of great value.

Definitions. At this point some definitions are needed.

Density: Amount of silver per unit area.

Opacity: Measured by the amount of light transmitted by any density.

Scale: Total range of opacities from darkest to lightest.

Ratio of Opacities: Relation of the opacity of each portion of a negative to the densest portion.

We will have to consider variations in opacities, scale, and ratio of opacities, density and ratio of densities. It may be mentioned in passing that the *density* varies with the logarithm of the opacity, so that a very small change in the density of any part of the negative will make a very great change in the opacity and printing power of that part.

Color as a Factor. Hurter and Driffield's investigations, while scientifically correct, are for our purpose entirely incomplete. Their work was done with monochromatic light, and takes no account of the effect of color on the observer or on the plate. In almost every case when they refer to "light intensities," they should have said "actinic light intensities." Shadows differ in color from the more brightly illuminated parts of the object, even though the actual color under even illumination be the same. The importance of this lies in the fact that color variations affect the photographic image entirely differently from their visual effect.

Where the different parts of an object are of different colors, the correctly exposed and developed plate, according to the H. & D. theories, may give an entirely erroneous impression of the luminosity (visual) of the

object, particularly when the effect of varying light intensities is superimposed on the actual color difference.

Scale and Opacity Ratios. In making a negative the first thing to be considered is the scale and opacity ratios desired, and when photographing a monochromatic object the problem is simple enough.

When color enters the difficulty increases. The same pair of colors may increase scale and opacity ratios under one set of conditions and in other circumstances may reduce the scale to almost zero.

Figure 1. To illustrate this particular point more forcibly, Fig. 1 has been made: a block was painted on two sides R—vermilion, B—ultramarine blue. To the eye, with both sides illuminated alike, the red side appeared much the brighter, and a correct monochromatic representation would have been medium grey for the blue and light grey for the red side.

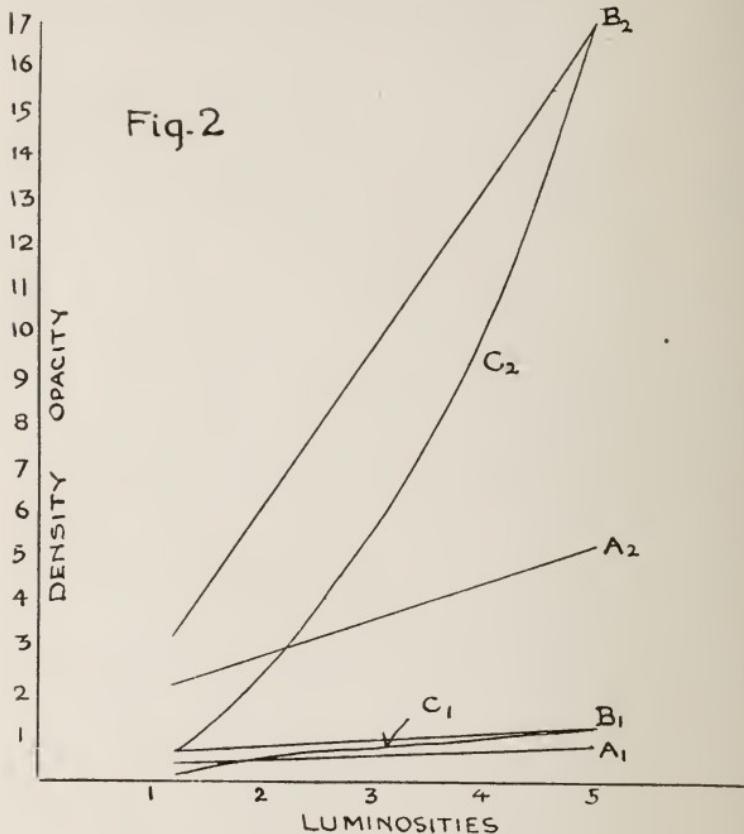
Two photographs, numbered as I and II in Fig. 1 were made: I with the red side of the block in light and the blue side in shadow, II with the block in the same position with respect to the light source, but with the blue side in light and the red side in shadow. It will be noticed that the print with the blue in shadow has a very low ratio, while the ratio is large when the red is in shadow. One curious point here is that I gives more nearly the usual effect of the object in the II position, and II that of the object in the I position than do the negatives of the respective positions.

The Criterion. With a firm grasp of the basic idea, that what we want in the finished print is a rendition of what we wish to record as we wish to record it, and with a realization of the possible effect of color on scale and opacity ratios—at present considered entirely apart from orthochromatic photography—the Hurter and Drifford method can be used, not as a means of obtaining scientifically correct luminosity ratios in negative opacities, but as a means of disturbing these ratios to aid in arriving at the desired end.

Opacity and Density Distinguished. There are three ranges of exposure: correct, under- and over-exposure. Correct exposure with correct development will give opacities which have the same relation to one another

as the amounts of actinic light reflected from the objects photographed. Long development will increase the opacities, the ratio of opacities, and lengthen the scale. Shorter development, still with the normal developer, will have the reverse effect. In each case the *density* ratio will remain the same.

Fig. 2 is plotted from Hurter and Driffield, curves, A₁ and A₂ being density and opacity curves for 4



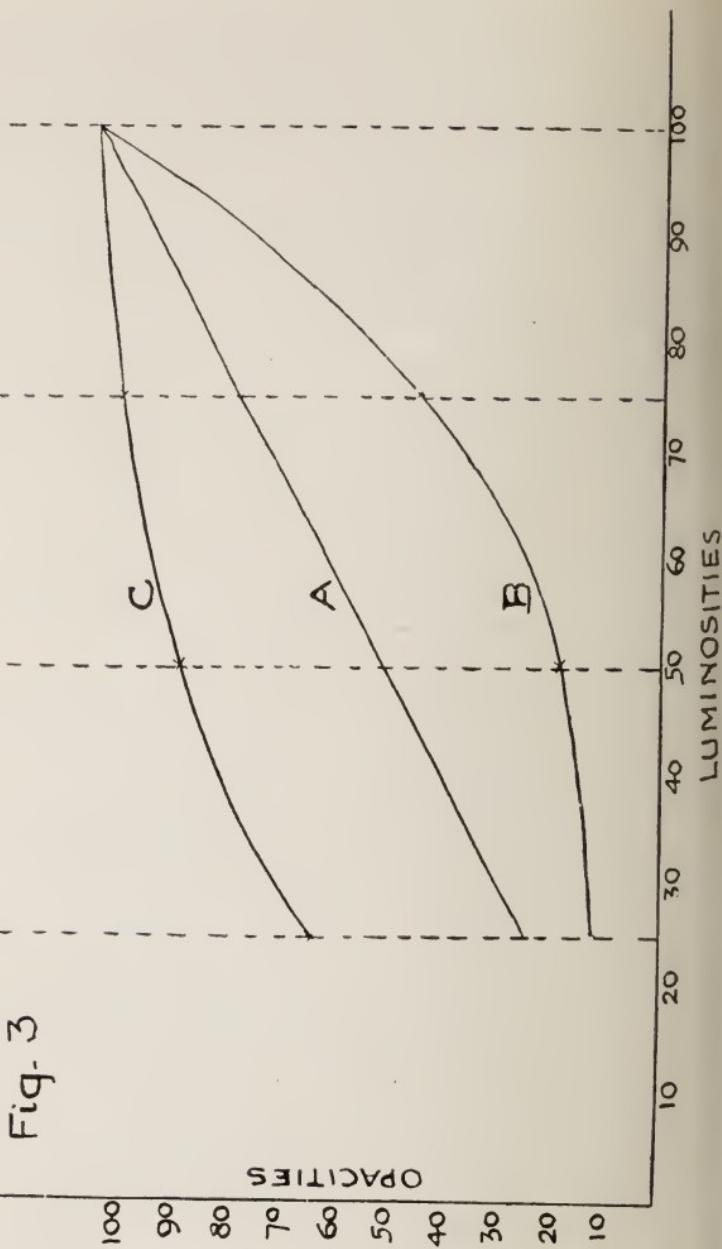
minutes' development, while B₁ and B₂ are the same curves for 8 minutes' development. In each case the object photographed had luminosities of 1.25, 2.50, and 5. Under-exposure has the effect of changing the *density* ratio in such manner that the opacity ratio alters, bringing the values for the halftones closer to

the values for the shadows, the result, if carried to extremes, giving what is known as the "soot and whitewash" negative. Over-exposure brings the opacities of the halftones closer to that of the highlights, giving an altered opacity ratio in the other direction and leading to "soft" negatives.

Basically, then, the opacity ratio for development carried to any given point is determined absolutely by the exposure. Varying the length of development varies the scale and the opacity ratio—it does not vary the density ratio.

Control. So far then, control consists in two factors: varying exposure to vary density ratio; varying time of development to vary scale and opacity ratio. These two elements can be varied in like or opposite directions. A long exposure with short development will yield a different negative from that given by short exposure and long development. An example in ordinary practice is the very high keyed print obtained when the exposure of the negative is extremely long and the development is carried to considerable density.

Result of Variation in Developer. Since the time of Hurter and Drifford's experiments, however, it has been found that there is a difference between the working of a normal and a very weak or very strong developer, particularly in the early stages of the process; so that, if with a certain exposure and normal development to a low scale, a certain opacity ratio will exist, if a *very weak* developer be used this ratio can be altered, apparently by the holding back of the chemical action in the most acted upon parts of the negative, due to the fact that there is so little reducer in the weak developing solution that it has to permeate and renew itself in the film before complete reduction can take place. The result is a reducing of the opacity ratio—a softening of the negative. Note that this alteration depends on checking the development early in the process and will lead to thin negatives. While at first consideration this effect may appear insignificant, we must remember that the *density* ratio is being altered, and that a very small change in this causes a considerable change in the opacity as shown in Fig. 2. There the reader will see plotted



(408)

two curves C_1 and C_2 , showing what would be the effect on opacity ratio of a slight change in density ratio.

Soft and Hard Working Developers. A very strong developer tends to reduce the silver in the most acted upon parts with increasing rapidity, and if checked in the early stages gives a thin negative with opacity ratios altered toward contrast.

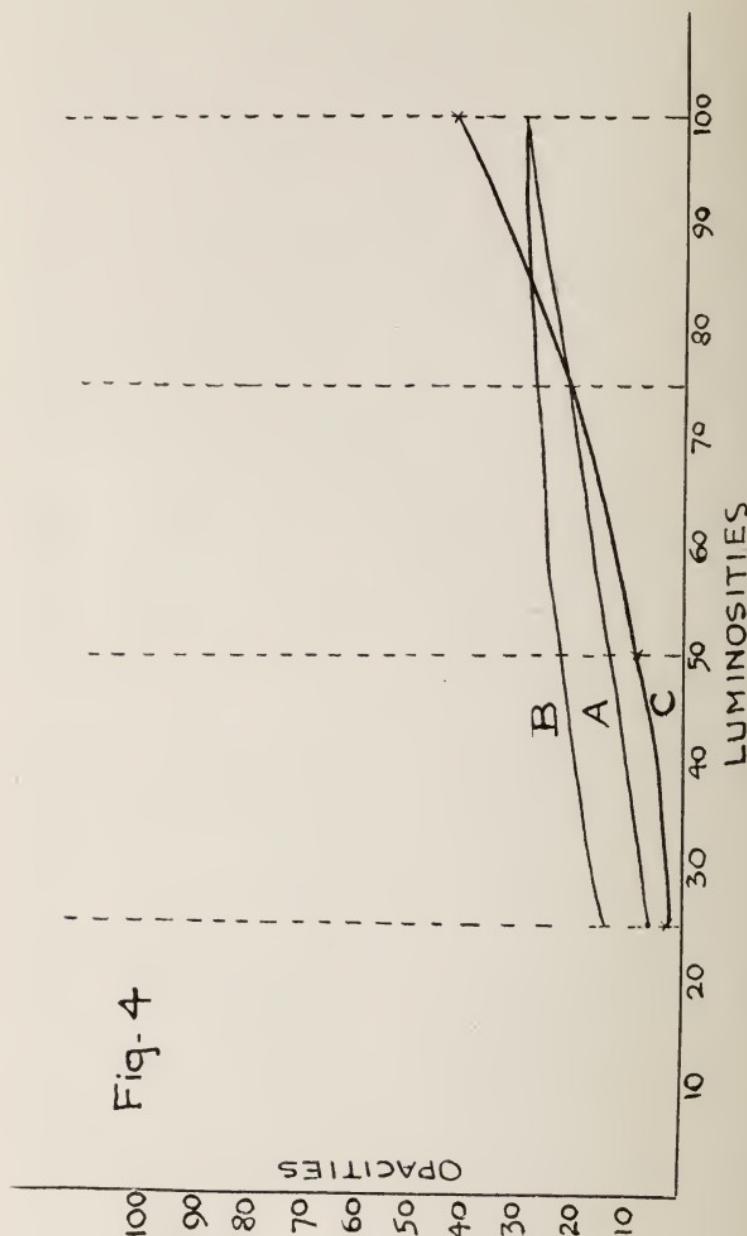
The effect of such a strong developing solution can be increased by using a "soft working" or "hard working" developer, the difference between the two, as far as we are here concerned, being that the first type brings out the deposits in the halftones and shadows almost as fast as the highlights in the early stages of development, later on in the process continuing to add density to the highlights until development is complete. The "hard" developer, on the other hand, rushes up the highlights and the halftones catch up later.

To Recapitulate. Control consists of three manipulation main factors: Exposure; Time of Development; Strength of Developer; the third being of importance only in the early stages, so that the attaining of the desired result depends on giving the correct exposure and checking the development at some point before completion.

Figure 3 shows qualitatively what results from under-, over- and correct-exposure with development carried to the identical opacity in the highest lights. The opacities are assumed to be for the correct exposure 10, 7.5, 5, 2.5, and are represented by the vertical lines erected at the points representing 25, 50, 75 and 100 intensities of actinic luminosities in the object photographed. A is the curve of correct exposure, B of under-exposure, and C of over-exposure. The opacity ratios for each case are shown in the figure.

Figure 4 shows with a given exposure, assumed to be correct, and development checked very early, the qualitative modifications due to strength of developer: A—normal, B—very weak, C—very strong, the last developed to identical density at the point of 75 luminosity. A set of opacities for each curve is given in the figure.

Correct Exposure. In the above discussion by correct



exposure is meant such an exposure that the *density* ratio in the negative is identical with the luminosity ratio of actinic light in the object photographed, when developed with normal developer. For the attainment of a desired result the "correct" exposure judged by H. & D. standards may be entirely incorrect.

Actinic Light. A brief discussion of what is here meant by the term actinic light may not be out of place. Photographically the light reflected from every point of an object is composed of two elements, that which affects the plate and that which does not, or but slightly. What the photographer is obliged to do is to use the actinic element to so affect his plate as to give a result approaching the visual effect of an object as he wants it recorded. From this difficulty arises the tremendous importance of color on the recorded scale of lights and shades, entirely apart from orthochromatic photography, and this seems to be a phase which has been more or less left out of consideration, i. e. the effect of color in rendition of light and shade.

Control consists then in the varying of the three factors before mentioned. With three independent variables in the equation it is easy to get lost in a maze of complexities, so that it is essential to pick out the few practical variations.

The Thin Negative. Without being dogmatic, the writer wishes to preach the gospel of the thin negative and the full exposure, not thin through under-exposure but through checked development. As a general rule it may be said that the exposure should run from a minimum which will barely give detail in the shadows to several times that amount. The upper limit depends on the color and luminosity of the highest light in the object photographed—it should not be carried to the point of reversal or fog. It results from this that an object without deep shadows or highlights has a much longer range of possible exposures than one in which the luminosity scale is long. Minimum exposure is determined by depth of shadow, maximum exposure by actinic luminosity of highest light in the object photographed. Depth of development depends solely on the opacity ratio desired and the type of subject photo-

graphed; and the ultimate opacity ratio is absolutely determined by the exposure.

A few empyric examples based on actual practice will be given, not as models to follow, but simply as indications of the author's practice and as a possible aid to the reader.

Typical Examples. First, consider a landscape of a very ordinary type: fairly light foreground, some trees and shadows, and a middle distance with a house, such a view that the exposure tables would indicate an exposure of 1-50th second. Using a 2-times color screen would call for actually about 1-20th second and the writer would give at least 1-10th second. Then develop in a strong developer of the ortol type to a low maximum density, the operation taking about 45 seconds. The result is a thin negative with a certain amount of snap to it. It will give a good, straight print on platinum or even that modern abomination, gaslight paper, and in addition has all the qualities needed for the ideal printing process, gum bichromate.

In portraiture the type of subject determines the type of negative to a great extent. To consider extremes, the young girl does not lend herself to the making of a strong negative accentuating her features and indicating a strength of character she does not possess. The opacity ratio should be shortened; expose very fully and develop slowly to the point where the scale is long enough to suit the printing process to be used. For the man with character written in every feature, we should preserve every variation of tone in each portion of the negative; there should be no smooth blending, so the exposure is reduced, a soft developer employed, weakened to a very great extent, and the process checked at an early stage. In this type of negative an evenly lit highlight will show infinite variation of tone values, due to the very small irregularities of surface, all of which could be ironed out by sufficiently long exposure and suitable development.

In studio work the question often comes up as to what length of exposure can be given without the subject moving and so ruining the negative. The writer's actual experience is that six to ten seconds can be given

without any bad results or the least irritation on the part of the sitter.

The principles of control have been laid down: to write more would be superfluous; applying these methods and practising for several years will enable the photographer to produce approximately the desired negative in perhaps three cases out of five.

The Scheme. At this point it may be well to lay out the matter already treated in the form of a scheme.

A. EXPOSURE.

	Alters density ratio.
1. <i>Under</i>	Halftones approach shadows. Tends to reduce total scale. Opacity ratio dependent on length of development.
2. <i>Correct</i>	Density ratios same as luminosity ratio in object. Opacity ratio dependent on length of development. Scale dependent on length of development.
3. <i>Over</i>	Alters density ratio. Halftones approach highlights. Tends to reduce total scale. Opacity ratio alters with length of development.

In each case there is a whole range of exposures coming within each classification.

B. DEVELOPMENT (Normal developer).

	Negative thin. Scale shortened.
1. <i>Short development</i>	Opacity ratio shortened. Density ratio unchanged—is as determined by exposure.
2. <i>Long development</i>	Negative dense. Scale lengthened. Opacity ratio lengthened. Density ratio unchanged—is as determined by exposure.

C. DEVELOPMENT (Strength of Developer).

Of value only when development is checked early.

- 1. *Very weak*. { Density ratio shortened by holding back highlights.
 Opacity ratio shortened.
- 2. *Very strong*. { Density ratio lengthened.
 Opacity ratio lengthened.

Type of negative is determined by character of subject, end-result desired, color of subject, relative actinism of lights and shadows, and printing process to be used.

Scale. Knowing the general type of result that is desired, the *kind* of negative best suited can be obtained. There is, however, one element which is determined almost entirely by the printing process to be used, namely the *scale* of opacities. This is, of course, dependent, in a sufficiently exposed negative, on depth of development, so that, having determined your basic density ratios by kind of subject, color, actinic luminosity ratio, etc., the actual point to which development should be carried is to a very great extent dependent on the printing process, always bearing in mind that when development is carried to a fairly heavy density, the slight control over density ratios due to modifications in the strength of the developing solution is lost.

The writer is a strong believer in the thin negative, so thin that if looked at against a blue sky the image, except in the very highest lights, is almost invisible. This subject will be taken up more fully under printing.

Demonstration. By the person anxious to work, a tremendous amount of practical knowledge can be acquired in a comparatively short time by following out a scheme somewhat as follows:

Take the whitest plaster statuette that is made, with plenty of folds and drapery, place it against a black velvet background, light it very strongly on one side, and make one or two hundred negatives, bringing in all the changes of exposure and development made possible by the scheme laid down in earlier pages, and see how the scale and opacity ratios can be altered. Change the background, putting up one of light grey, and notice by a repetition of negative making that with

the same exposure and development the values are all apparently shifted. Remember that in a picture the only things that count are appearances.

After this take an object such as a statuette colored in reds, greens, and blues; with this can be studied the effect of color on the rendition of light and shade, as well as its influence on opacity ratios. This is of great importance and, at the risk of repetition, it must be emphasized that this phase of color study has nothing at all to do with orthochromatics. If it be objected that this suggestion involves considerable time and labor, let the reader remind himself that Albrecht Durer spent two years in making detail sketches before he began to paint the Heller altarpiece.

Lenses. Some consideration should here be given to lenses and plates.

The **Anastigmat** of any given aperture and focal length will give a defined image between two planes of distance, a *defined image* being considered as one in which the projection of a point does not exceed 1-100th of an inch in diameter. The larger the aperture and the greater the focal length, the shorter is the "depth of focus" or range of the field of definition lying between the two planes of distance mentioned. Where a sharp, evenly defined image is desired, the anastigmat should be used. However, remember that an out-of-focus negative made with an anastigmat is an abomination.

The **Petzval Portrait Lens** has, as the aperture is large, slight depth of focus, and as its field is spherical, if the focusing be done on the center of a plane diagram, the edges of the image will not be defined. For certain kinds of portrait work, particularly large heads, this lens is admirably suited, giving crystalline definition to the principal object.

The **Soft-focus Lens** is the most abused and retaliatory instrument in the field of photography. Its use will never aid a man without the craftsman's sense to produce good work; its misuse can ruin anyone.

The original soft-focus lens of the present type, as far as the writer knows, was a single combination, partially achromatic lens, introduced by Smith, later the Pinkham & Smith Co., of Boston. In the use of

such a lens the blue and more actinic rays come to a focus at a point farther from the lens than the red or more visible rays. The consequence is that, focused by the more visible rays, there is a greater or less dispersion of the more actinic chemical rays, giving the effect of a halo about the dividing-line between lights and shadows, and in the surface of the highlights. This can be reduced by focusing on a highlight, and then racking back for a distance which can be ascertained by experiment, or by focusing on a portion of the object with predominating cold tones as in the shadows. Try focusing the identical object, holding first a piece of blue glass and then a piece of yellow glass, held between eye and ground-glass, noticing the difference in the resulting negatives. Individual lenses of this type differ much; some are too incorrect (or not sufficiently corrected for practical purposes) and require stopping down or very careful focusing.

Figure 9. The result obtained by a proper use of the lens is a separation of planes of light and shade, and a subduing of detail without loss of necessary definition. Fig. 9 shows the effect of this separation of planes, giving a pleasing roundness of projection with satisfactory definition in near and distant portions of the object. The misuse of the soft-focus lens results in a print which makes one dizzy to look at.

There are certain photographic qualities which are intrinsically good; others which are intrinsically bad. The soft-focus lens, a misnomer by the way, can add nothing, but can aid in the elimination of the bad qualities. The trouble is that most of them do introduce a set of bad qualities distinctly their own, i. e., due to inherent constructional or correctional defects.

Focal Length. The longer the focal length of a lens, the better the perspective, so use the greatest focal length permitted by the circumstances. Do not purchase on a basis of covering power. A good general rule is to use a lens with a focal length more than double the short diameter of the plate.

Plates. Makes of plates differ in action, but once understood will give about equally good results, therefore the advice in the beginning to stick to one brand of

plate. Fast plates are needed, and very fast plates are not orthochromatic, but they do usually work with a lower density ratio than slow plates, so that, for portraits, comparatively long exposures and well-judged development will yield a negative suiting the subject.

For every possible sort of work where speed is not essential, the double-coated orthochromatic plate is the best plate. It will stand great increase in exposure without reversal, is more sensitive to changes in the strength of the developer than the ordinary plate in the earlier stages, and of course has the power of giving a much longer scale if desired.

Visual and Luminosity Contrasts. The subject of orthochromatics is one on which a considerable sized volume might be written. Visual contrasts, in an evenly lighted subject, are to a great extent due to color variations, and may be very different from actual luminosity contrasts. The color of a shadow differs from the color of a highlight, consequently the photographic image, being very dependent on color, as it is formed by the action of actinic light, may, and usually does, give a totally wrong effect of color suggestion in the finished monochrome record or print.

Filters. For outdoor work a color-screen is almost essential, i. e., a screen which simply reduces or subdues the action of the most actinic rays. A heavy screen usually leads to disagreeable effects. Thus, a screen increasing the normal exposure twice, and used, in practice, as a fourtimes screen, often gives a very pleasing effect in the print. For portrait work, a screen is rarely needed, the double-coated plate with a proper exposure and suitable development, giving the photographer the sort of negative he wants.

Choice of End-Result. Up to this point only the technics or mechanics of photography have been considered. Before touching on printing there must be taken up the most difficult part of the subject, not only to learn but to write about, namely, the making of the decision as to what is to be accentuated or suppressed, what scale of contrast is to be used, and whether the print is to be made on a straight or commercial paper,

or by a process in which the photographer has complete control in manipulation and result.

Decorative Quality. First of all, in this consideration, the value of a picture to the onlooker is, omitting any value due to the interest of the subject, due to its decorative qualities, a combination or arrangement of tones and form which gives an abstract pleasure. If the photographer has not by nature a decorative sense he had better leave the craft of photography alone.

As a sort of example one may consider two portraits of the same subject, equally correct as to likeness, alike in dress and mechanical technique—one is better than the other, not as a portrait but as a picture. Why? The answer is decorative quality.

Cultivating the Decorative Sense. Study good pictures: the Byzantines, Italian paintings, Japanese prints, Tanagra figures, and, to mention one man in particular, El Greco. Read Clive Bell on "Art" several times and learn to SEE. Discarding superfluities, what is there in a particular landscape that pleases? Remember to strip away the color, leaving only detail and form; still further simplify, reject detail and come to the actual tone values and mass arrangement. Having done this, accentuate and suppress, by choice of lens, exposure, developer, development and printing. If the original conception was correct, the end-result, the print, will be worth while.

It may occur to some as an absurdity that the study of the masters of art should be an important part of a photographer's education, but what is therein to be learned is so very basic that it runs through all art from the lowest to the highest. Art does not exist without it, and the best place to study anything is where it is best practised.

The Test of the pudding is in the eating thereof, and the test of the photograph is the print, hung where you have to see it several times a day. Almost anything looks good for a few minutes—novelty always pleases. A fish may taste very good, but result in ptomaine poisoning.

Printing Processes. There are two types of printing processes: those in which the image is formed by chemi-

cal deposit, and those in which it is formed of a pigment. Between the two there is no comparison, with the single exception of the platinum print, and possibly an occasional bromide print.

The pigment print is in a class by itself. There is in general a surface quality which is pleasing or displeasing. Properly applied pigment has a pleasing quality; chemical deposits have not, again with the exception of platinum, which, with its deposit of platinum black almost partakes of pigmental quality. All things look alike in the dark. A pigment print and a silver print in subdued light may have much in common, but in the glare of a bright light the silver print will be a weak and frail thing, while the pigment print loses little or nothing of its quality.

Look out for surfaces; there are several mechanically made surface qualities in manufactured papers which bear the same relation to natural variations that a pressed concrete block does to real stone.

We will consider briefly two processes of so-called "straight" printing:

The Bromide Print reproduces very nearly in the form of light and shade the opacities of the negative. It is capable of giving a very good black in the deep shadows without masking the detail and is simple in manipulation. The photographer must here get what he wants in the negative. Somewhat different results are given by different papers, and here, as is usually the case, the English worker has a much wider field of choice than the American. Our manufacturers will only make that for which there is a large sale; their attitude is that if you don't want what they make they can do without your business.

A fairly weak developer of the ortol, metol-hydro, or amidol type will give good results with bromide paper, varying slightly in color. The exposure must be about right—of course directions for this cannot be given—and the development ought not to be forced. The negative needs to have a fairly long scale as a weak chemical deposit accentuates its own bad qualities.

The details of bromide printing have so often been treated at length elsewhere that it is not necessary to

repeat them here, except to utter a word of caution. Bromide prints can be toned, but unless done by the hypo-alum process, carried forward only slightly, the resulting colors are intrinsically bad—so don't.

The Platinum Printing Method is the king of ordinary printing processes. It will give a rich print from a thin negative, so that it lends itself to control in negative development. It is expensive; at the time of writing, metallic platinum is worth, or rather costs, from \$125 up per ounce; but it is worth the difference. Increased depth of printing gives a longer scale in the print and the rich shadows that are so pleasing.

By adding a *very small* amount of mercuric chloride to the developer, and using it hot, the color of the print can be made a warm black; by adding more of the mercury salt a rather unpleasant brown tone can be obtained, which, however, is not permanent. The black platinum print—provided that the black deposit is actually pure platinum—is absolutely permanent.

At considerable cost platinum paper can be made as needed, and its natural scale of contrast altered to meet individual requirements. The writer has used the formulas given by Miss Stanbery in THE PHOTO-MINIATURE No. 96 with complete success. Evenness of coating or otherwise does not make much difference, but rapidity of drying does. It is a lot of bother to size the paper so that the coating will not sink in, but good papers may be had which do not need sizing. For example, any of the good Japanese vellum papers, Whatman drawing-papers and, perhaps, best of all, the so-called French Vellum papers, can be used.

In using Willis & Clements' platinum paper, a strong hot solution of neutral potassium oxalate gives an agreeable color; their sepia paper may be developed in the same bath, this giving a rather warm black color with low contrasts.

Sometimes a dead surface print may be aided by roughing. One way of doing this is, when the print is moist, to lay it on a sheet of lintless blotter in a letter-press, cover the face of the print with a more or less rough cloth, and squeeze hard, letting it dry under pressure. The surface effect so gained is permanent.

The Pigment or "Gum" Print. Finally, we come to a consideration of the pigment print. There have been many pigment processes devised: carbon, oil, bromoil, Artigue, gum-bichromate (sometimes politely called photo-aquatint), and their modifications. One good process is enough to build upon, so the easy, inexpensive, and much-abused gum-bichromate method of printing will be the only one considered.

Its Flexibility. In negative-making the voluntary alteration of opacity ratios is confined within comparatively narrow limits, and the straight print is in every case a nearly mechanical reproduction in monochrome of the negative opacities. To hold complete control to the end of the story, it is necessary to use an entirely flexible printing method which has no other rules than the will of the photographer, one in which the luminosity ratios can be altered at will, in which one set of tones can be modified without affecting others, and where mass relations can be altered by suppression or accentuation of certain elements. These things can all be done in gum-bichromate, and it is owing to this flexibility that, in the hands of the tyro, the method leads to such undesirable results.

Character of Image. There is a general feeling that this process is only adapted to broad effects and gives a somewhat woolly, loose-grained image. This is entirely a misconception, as a smooth print with complete gradation is just as easy to make as one of the other sort. Compare Figs. 7 and 9 among the illustrations of this issue. The photographer has at his disposal the whole range of color. He can build up or suppress the contrast scale at will.

The working directions for gum-bichromate printing are simple, but the making of satisfactory prints is a matter of much practice and foreknowledge of what will be the result of any operation undertaken.

The Coating-Mixture. It is much easier to build up than to suppress contrast, hence start with a thin negative free from fog.

There are three elements in the coating-mixture employed: gum solution, 10 per cent potassium bichromate solution, and pigment.

The gum solution should not be weaker than two ounces of the best gum arabic tears that can be bought, in five ounces of water. Strain the solution through a handkerchief and keep dust from getting in it. Use good colors: Winsor & Newton's water-colors, in tubes, are the writer's preference; red chalk can be ground up in a small mortar and is first class. Cheap colors do not pay.

Variation. Coating-mixtures can be infinitely varied at will, but a sort of standard formula may be given. For example: Put 2 drams of gum solution into a small mortar, add 4 drams of bichromate solution, with enough color to give you the effect desired in the print, and grind all together for about 30 seconds. There is a certain maximum of color that must not be exceeded, otherwise the whites of the print will be permanently stained. In the mixture above given about three-quarters of an inch of color squeezed from its tube will do; if you use powdered red chalk take from 12 to 15 grains.

Manipulation. The paper to be coated is pinned flat to a board, and a thin, even coating of the mixture laid on with $1\frac{1}{2}$ -inch wide bears'-hair brush. This coating is smoothed over by a few strokes with a 4- or 5-inch flat badger's-hair brush and the paper is hung up to dry.

The amount of mixture above given will coat four or five 9 x 11-inch sheets of paper, which can be cut down to 8 x 10 inches by trimming off the irregularly coated edges. Rub the coating-mixture in well and dry rapidly by pinning the sheets up over a radiator or other source of moderate, dry heat.

Printing and Development. Print with any convenient form of print meter for about half as long again as would be needed for printing-out paper. Immerse the print in *cold* water until saturated, then float it, face down, on the surface and leave it alone. It will be developed in from half an hour to forty-eight hours. Development can be considered as complete when the drippings from the corner of the print, when held up, are clear of color. Change the water after the first few minutes, and have it cold. If the print is under-printed

and hung up when the color can run, the halftones will run over the highlights, causing stains. This is the simplest form of gum-printing. The modifications are legion.

Modifications. Taking up those which are independent of mechanical aid, the first is in the amount of color. The maximum amount that can be carried without staining depends on four factors: the paper used; actual weight of dry gum; proportionate strength of gum in the mixture; and rapidity of drying.

Any good charcoal paper, Arnold's unbleached of either surface, toned detail paper, are all good and will stand plenty of pigment.

Amount of Pigment. In a solution of given strength, so much gum will carry so much pigment. Thicken the solution by decreasing water in the original gum solution or using less bichromate solution and more pigment will be needed to cause staining—but it is safer to keep well below the staining point. Less pigment will decrease the contrast scale; more will increase it. This is obvious.

Printing can be carried to a point where most of the gum is rendered insoluble and will not dissolve, or it can be checked so that above any given point in the scale you will get white paper in the print. Too heavy a load of pigment, even if it does not cause stain, will have a tendency to give granularity in the highlights. Printing in the shade also gives a more granular print than when the printing is done in full sunlight.

The Scale can be modified by the color used—a grey has a shorter scale than black, as its maximum depth is that of the color itself.

Multiple Printing. The next degree of control is through successive or multiple printing. In this method first adjust the negative by any of the well-known ways to secure registration in the several printings. Now if the first print be made giving the desired depth of color in the highest light, the print then developed and dried, it can be again coated with a similar mixture as used for the first printing and exposed for a shorter time, when the second development will give a print wherein the highlights and lighter halftones are un-

affected, but with the shadows and heavier tones increased in depth. This means increasing total contrast, and, what is even more important, increasing the ratio of the lower tones, below a certain depth, to those above them.

Each of these two printings can be carried to any point desired, and even a third printing can be made. The scale of a thin negative can be built up so that the print runs from white paper to heavy black. By this means every tone from a predetermined depth to the deepest may be varied, and by simple mechanical manipulation, certain chosen tones near the center of the scale can be varied almost at will.

Variation in Pigmentation. The next modification is the use of different amounts of the same pigment in successive printings. If the first printing be done with but half the usual amount of pigment, and be printed for the highlights, and the second print, carrying the full amount of color, be exposed for the shadows, the resulting print will be very marked in the differentiation between the lighter and the heavier tones. It is actually an increase in the scale, but it is of a peculiar kind, and might be said to result in a print with two separate scales of luminosities, one for the light tones and one for the heavy tones. The result is usually brilliant. A further modification is to make the first print with a heavy pigmentation and the second with a weakly pigmented coating.

Only the merest indication of these things can be given, as they must be made a matter of experiment by the photographer.

Figures 5 and 6. Among the illustrations two prints are shown from the same negative, Figs. 5 and 6, the first a platinum print, and the second a multiple gum in which the scale has been much extended.

The Use of Color. Different colors may be used in successive coatings, but this is a tricky proceeding and very limited in its uses. The use of a warm color for the whole print in the first printing, with a second printing in a colder shade for the shadows only, is the kind of two-color work which is safe. Note that as the color of the second printing is always affected by

the one underneath, the result is not always what is expected.

Mechanical Variation. The second set of variations depends on mechanical treatment. If a print be made of such depth that it will only develop with great slowness by floating, a stream flowing over its surface will bring it out. If a still deeper print be made, it can be washed over with a brush, either locally or in its entirety. Where the printing has been carried still further, a print will be obtained which can be brought out only by washing or scrubbing the whole print with a fairly stiff brush.

Figure 7 shows a heavy, single-coating print printed so deeply that the higher tones could not be developed by soaking. The whole print was therefore developed by plain, straight brushing, the accents being put in by means of brush and atomizer.

In **Figs. 8 and 8a** we can compare a straight gaslight print from a thin negative, and a heavy, single-coated gum print from the same negative, the background in this latter print being developed by spraying with an atomizer. In this work the print is first laid down on a glass plate and stood up vertically while the spraying is done. It is understood that in every case the print must be well soaked before starting operations of this kind, and the printing must be thorough. This sort of treatment, of course, always breaks up the surface of the pigment coating and makes it more or less grainy.

If a first print be made quite heavy in pigment, then brush developed, and a second print be made on top, a new set of results is possible. A case in point is that of a straight gum print which showed too much shadow under the eyes and cheek-bones. A first print was made, brush-developed all over, then the shadows before mentioned were almost eliminated. The second print was made with a mixture carrying but little color, and the modeling wiped out in the first print replaced in a higher key in the second.

Where the subject is a landscape, with some feature in the middle distance which should be accented, a first printing can be brush-developed, most of the print being eliminated in this process, and then the second print made and developed by floating.

It will be seen from this brief recital of experiments that the possibilities of variation and control are endless.

Character of Surface Texture. A usual criticism of the gum process is due to the rough texture of the print surface. In an unmanipulated print, even with a heavy color content, there is no reason for not having a smooth, unbroken surface, in fact the writer is at a loss to know what causes such graininess. Figure 9 is reproduced from an 8 x 10 print simply to show that a gum print will be smooth and free from woolliness or grain if left alone. This print is a single-coated gum from a thin negative developed by floating. Playing with a gum print while it is developing nearly always leads to trouble. Incidentally, this portrait also shows that the soft-focus lens, in this instance a Smith Semi-Achromatic, will give all the sharpness desirable, even in a large head made with the lens at full aperture.

Flexibility of Technique. The gum process is so entirely flexible that one can only give the results of experience. What is one man's meat is another man's poison, and the writer knows by sad experience that following other people's methods often leads to catastrophe. Nevertheless, using the few hints given here may provide a point of departure, from which the reader can build up a technique of his own. No printing process is really good or "worth while" which cannot be mastered, and no "straight" printing can be mastered, simply recording mechanically what is there to be recorded within the narrowest limits of forced variations. The gum process simple though it is, must be driven where the photographer wants it to go—and therein lies its great value. It can be made a medium of personal expression, and, combined with a thorough knowledge of the technique of negative-making as a means to an end, varied and controlled in innumerable ways until the end-result desired is attained. No other process is there which has such great simplicity, and will, at the same time, respond so completely to the photographer's will.

Range of Tones. It has been said that gum is a "short-scale" medium, that a long scale cannot be had

at one printing, and that if it be printed for the highlights, the shadows will be blocked and without detail. This has not been the writer's luck. On the contrary, with a proper negative, a full range of tones from white to black can be had at a single printing, and the object of the multiple printing methods described herein is to build up or down and otherwise alter the scale of the negative where this is desired.

Gum-Platinum. There is a combination process, gum-platinum, which has beauties of its own. If a platinum print first be made which gives the rendering of the lights and halftones desired, the shadows may be strengthened and vigor, with variations in tone values, given by making a careful registration, coating with gum mixture, and printing to a point which will give the increased depth desired below any given point in the scale.

The gum coating for this purpose should be smooth, and the print very carefully handled when wet, as the wet coating is exceedingly sensitive to mechanical injury, and a very smooth pigmentation is desirable in the finished print.

Sizing Paper. A question which very frequently comes up in gum and gum-platinum printing is that of the sizing of the paper. There are plenty of papers made which do not require sizing, even for multiple printing, and it is easier to find such a paper and stick to it than to bother with the sizing of odd papers. Queer paper never made an artist. Another point on size and sizing is that some papers seem to repel the coating. These had best be left alone.

Questionable Helps. We can now consider a number of more or less meretricious aids in photography, the object of which, in the last analysis, is the alteration of scale and tone ratios. These aids consist of negative stain, intensifiers, reducers, and the like.

Negative Stain is caused by using a developer, such as pyro, which will give it; the whole negative is of a yellow color, particularly noticeable in the shadows. This stain is supposed to give "printing quality" in a thin negative—it does tend to hardness and for gum printing is very harmful.

Intensifying increases the opacity ratios of the negative, giving a longer scale. If a single solution intensifier is used, local intensification is a very simple proceeding. If it is desired to intensify the face in a portrait, the negative is dried and the intensifier applied to the face only with a soft brush. This is quite successful where the background of the portrait is almost clear glass in the negative, since this is not affected to any appreciable extent by any of the intensifier which may get past the edge of the face, otherwise it is almost impossible.

Of Reducers, there are two kinds: that generally called Farmer's reducer, and ammonium persulphate. The first type acts on the fainter densities of the negative at least as rapidly as in the heavier, so that if the operation be carried to extremes, the lower densities will be reduced to clear glass, while the heavier parts of the negative will have fair density. The result is similar to that obtained by under-exposure.

The ammonium persulphate reducer, on the other hand, attacks the denser parts of the negative with the greatest rapidity, thus causing a shortening of the density and opacity ratios and a shortening of the scale. The general result is similar to that produced by over-exposure and, if carelessly used, this reducer will lead to undesirable flatness.

Enlarging Negatives. It is often convenient, especially in landscape work, to use a small camera, the resulting negative being afterward enlarged to any desired size. In the making of this enlarged negative, which is merely the photographing of a transparent positive by ordinary means in a special camera, everything that has been said of negative control applies with equal force; in fact, to a magnified extent, since scale and ratios may be changed or modified in the making of the transparency as well as in producing the enlarged negative.

The Simplest Procedure is to make the transparency or positive by contact with the original negative in a printing-frame, taking the most scrupulous care to have no dust between the negative and the transparency plate. For most purposes I prefer a double-

coated plate in this method, as yielding the most satisfactory results, though if a very brilliant enlarged negative is desired a regular transparency plate may be used.

The Scale and Opacity Ratios in the positive or transparency depend on exactly the same factors as in an original negative, therefore govern your exposure and development according to the result desired, although it may be given as a general rule to keep the positive soft and rather dense. This is owing to the fact that enlarged negatives made from thin positives have a tendency to be disagreeably harsh.

The Exposure and Development of the final (enlarged) negative call for good judgment in order to ensure the desired result. By this enlarging from a small negative to the desired size, effects can be obtained which are not possible either by direct photography or by enlarging from a small negative onto paper. The reason is obvious: as often stated, one of the main elements which interfere with complete control is the color of the object photographed, and in photographing a negative this disturbing factor is entirely absent.

Practical Classifications. All of that sort of photography which we are here considering can be divided into two major classes, requiring different technical handling. The first includes portraits and figures, whether indoors or out-of-doors, where the head or figure as the case may be is the one and only important feature of the photograph, all else being background. The second class includes landscapes, views, landscapes with incidental figures, and the so-called "genre" pictures, where these last are not carefully made up studio counterfeits.

Over objects falling in the second class there is but one form of control, that of selection, both as to position, elimination and illumination; the rest is technique as it is here understood.

Control in Portraiture. When, however, the first division is considered, then there is the placing, draping and lighting—all at the control of the photographer, and a mistake in any one will ruin the best conception. At present much attention is being given to the lighting

of heads and figures, with results surprising and marvelous to behold. Artificial lights are placed at odd points, picking out and shining on different parts of the head or dress, and giving effects certainly never seen outside of a photographic studio or a stoke-hole. These results are novel, and, for the moment, pleasing, but, to venture a prophecy, it would seem as though in the course of time they will be relegated to the limbo of puffed sleeves and imitation rustic furniture as an aid in portraiture. These others were thought beautiful in their time. In the larger sense nothing is beautiful unless it remains so permanently, consequently it would seem the part of wisdom to stick to the utmost simplicity in lighting, unless the masses of light and shade in the subject lead directly to decorative spacing and mass relations.

A study of the greatest portrait painters will show very little trick lighting. Holbein's drawings are wonderful—and simple. Why is it necessary to discard the experience of the centuries when the camera is the tool?

A Test. A rather good test of the excellence of the portrait of a charming woman is to imagine the homeliest conceivable woman in place of the real subject. If the picture is pleasing in spite of its subject, it is rather liable to be good in the abstract sense.

Subject interest and pictorial interest are absolutely independent, and many a poor picture is hung in our museums, mistaken for art, because of the quality of its representation.

A teacher of art once remarked to his students that he knew of no class of people so devoid of good taste as artists. There seems to be a general idea that the mechanical ability to lay paint on a canvas carries with it good taste. Is there any reason why it should?

Summing Up. To anyone who has read what precedes this, the object of the monograph must be fairly clear. There has been no attempt at a compilation of formulas, or at a course of instruction, but merely a more or less analytic study of how and in what manner well-known processes can be bent to the will of the photographer. No unyielding medium can be used other than in a mechanical way, consequently the short consideration

that has been given to printing processes which, on account of their narrow limits of variation, can only give good and satisfactory results if the negative contains all that is desired and no more.

The craftsman and the artist do not depend on quantity production for their reward, so why should he who wishes to practise photography as a means of individual expression? The curse of photography is the ease with which it can be turned into a mechanical proceeding, in which the operator bears the same relation to the finished product that the boy who feeds steel bars into an automatic screw machine does to the screws resulting from the brain activity of the man who designed the machine.

The surface of the possibilities of photography as a craft have hardly been scratched; incessant work and study are the only roads that lead to success and the power to impress the individuality of the photographer on his finished product.

T. O'CONOR SLOANE, JR.

BOOKS

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PICTORIAL COMPOSITION AND THE CRITICAL JUDGMENT OF PICTURES. A Handbook for Students and Lovers of Art. By Henry R. Poore. 11th edition. Revised. 280 pages. Profusely illustrated. Cloth, \$2.75.

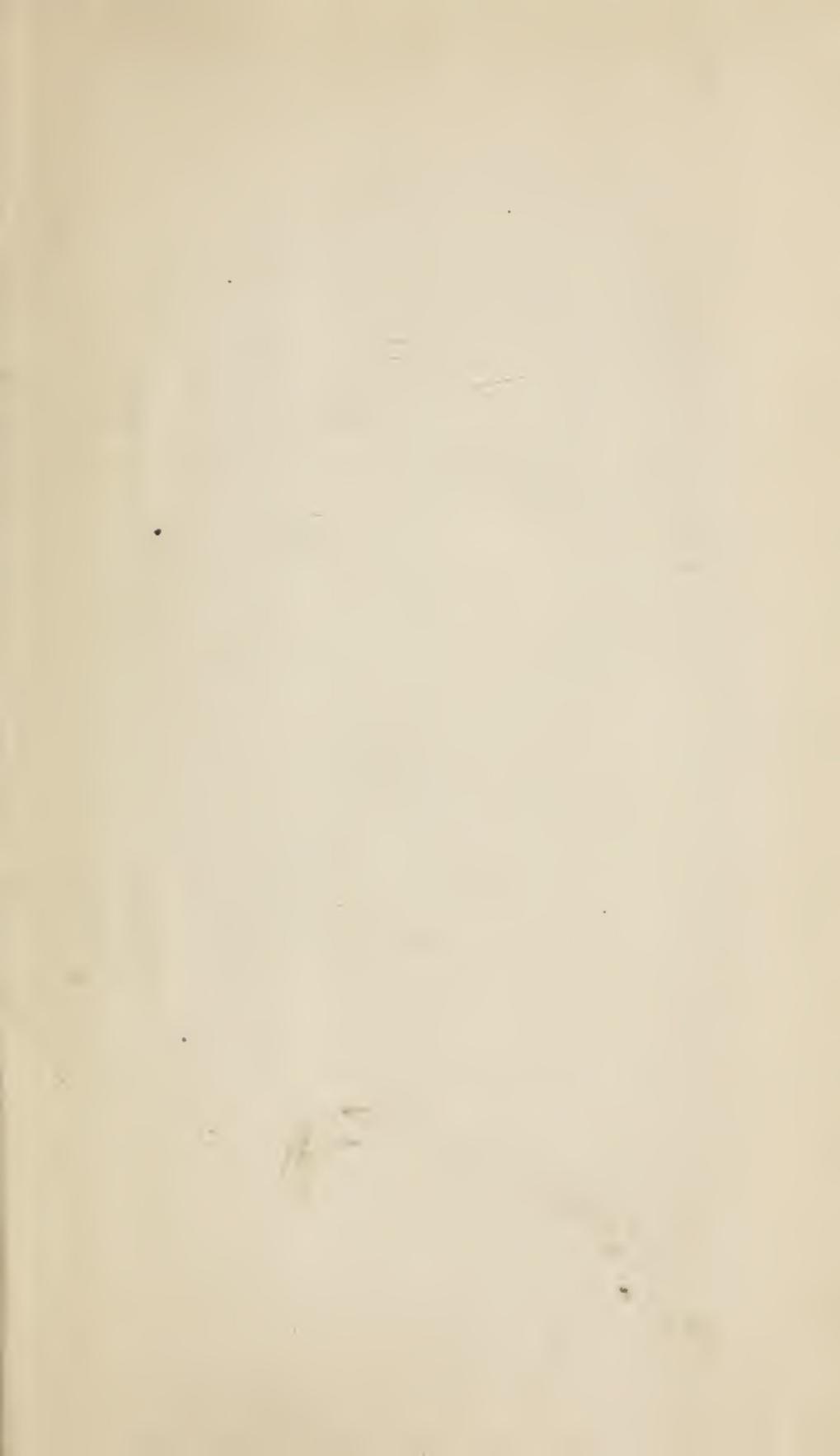
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ESSAYS ON ART. The Education of the Eye. Practical Hints on Composition. Light and Shade. By John Burnet. 1882. Republished 1913. Fully illustrated in line and half-tone. Cloth, \$1.50.

Notes and Comment

ONE-MAN EXHIBITIONS. The Camera Club of the Boston Y. M. C. A. has arranged a series of one man exhibitions for 1919-1920 as follows: October—Louis Fleckenstein, Los Angeles, Calif.; November—John Wallace Gillies, New York City; December—Miss Margrethe Mather, Los Angeles, Calif.; January—Frederick F. Frittita, Baltimore, Md.; February—Ford Sterling, Los Angeles, Calif.; March—Annual Exhibit of Work of Club Members; April—George Alexander, Chicago, Ill.; May—Edward R. Dickson, New York City. Each exhibit will consist of twenty-five prints. The Club rooms are open to the public every Wednesday evening and Saturday afternoon, and all interested are cordially invited to visit the exhibitions.

THE APPEAL OF THE PICTURE. There is a fine note of comment on this in the interesting "Recollections" of Sir Sidney Colvin, now being published in *Scribner's*. He is speaking of "those who declare that painting must appeal to the eye and to the visual emotions only, and stop there—that any sign of mind or meaning behind the visual effect is a positive blot on a picture, and makes of it 'literature in two dimensions' and the like." And the comment is: "Nonsense! of course—and it should need no saying—the primary and essential appeal of every picture must needs be to the eye, by its harmonies and rhythms of line and color, its balancings and massings and proportions and contrasts of light and shade, and by their effect upon the visual emotions. If such appeal and such effect are not forthcoming, or if they fail, the picture is naught; but if they succeed and the picture is a picture indeed, then the more of mind that can be felt behind it, the richer the associations and suggestions it conveys, the better."



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